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#447-201 A

08/778110

SHAVING COMPOSITIONS CONTAINING PARTICULATE ADDITIVES

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4 Related Patent Applications

5 This invention is a continuation in part of U.S. Patent Application 08/634,602,
6 filed April 18, ¹⁹⁹⁶~~1995~~, and now U.S. Patent 5,587,156 issued December 24, 1996.

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8 **I. BACKGROUND OF THE INVENTION**

9 a. Field of The Invention

10 The present invention relates to all shaving compositions which include particulate
11 additives, and more particularly to all shaving compositions, whether in the form of a
12 solid, gel, cream, liquid, or aerosol, which include solid, insoluble particulate additives.

13

14 b. Description of the Related Art

15 Solid particulate additives have been employed in a host of cleansing
16 compositions for use in the removal of foreign materials, as well as dead skin cells from
17 the skin surface. These well known cleansing compositions are described, for example,
18 in U.S. Patent No. 4,155,870, in which glass bubbles are incorporated into the cleansing
19 medium, and U.S. Patent No. 4,157,387 which describes a cleansing composition
20 incorporating a water soluble polymer as an abrasive for use in cleaning the skin and for
21 removing dead skin cells from the skin surface. The art of incorporation of fillers and
22 abrasive additives in soaps is well known and described in prior art such as Kanfer, et.
23 al., in U.S. Patent No. 4,786, 432. Other examples of soap compositions containing
24 particulate additives are disclosed in U.S. Patent Nos. 4,187,288 by Cordon, et. al.,

1 4,735,746 by Speranza, et. al, 4,051,056 by Hartman. In each of these references abrasive
2 impregnated soap provide excellent scrubbing action, thereby producing not only a
3 cleaning action, but also superior post-cleansing skin smoothness.

4 Conventional shaving compositions, whether in solid, gel, cream, liquid, or aerosol
5 form (before and/or after application to the skin), generally include lather producing
6 chemical compositions and/or foam inducing agents, however, they are not required to
7 contain such foam inducing agents. Typical shaving compositions are described in U.S.
8 Patent Nos. 3,852,417 by McLaughlin, 4,145,411 by Mende, 5,034,220 by Helioff, et. al.,
9 4,999,183 by Mackles, et. al., and 5,326,556 by Barnet, et al. These shaving
10 compositions all contain wetting agents or surfactants, and foaming agents. These prior
11 art shaving compositions typically contain five to fifteen percent by weight stearate soap,
12 such as sodium stearate, potassium stearate, or mixtures thereof with weight ratios in the
13 range of about 2:1 to about 8:1. They also include emollient additives such as coconut
14 fatty acids, castor oil, coconut oil, or other complex oils. Lubrication is achieved in
15 shaving compositions by employing a combination of one or more of the aforementioned
16 oils and fatty acid monoethanolamide or diethanolamide. Such shaving compositions
17 may also include wetting agents or surfactants to enhance adherence of the media to the
18 to-be-shaved hair and surrounding skin. Furthermore, when wetting agents are included
19 they also provide some degree of and limited physical support for the shaving blade,
20 thereby improving blade glide and reducing skin irritation. Furthermore, some of the
21 compositions described in prior art include claims for additives such as inorganic salts
22 which enhance lubrication; however, these additives, such as those described in U.S.
23 Patent No. 3,852,417 by McLaughlin, are water soluble additives such as polysiloxanes in
24 amounts of up to 5 percent by weight, or water soluble polymeric materials of up to 5

1 percent by weight, such as polyvinylpyrrolidone or polyethylene oxide.

2 It is therefore seen that current shaving compositions, whether provided in the
3 form of a solid, gel, cream, liquid or aerosol (before and/or after application to the
4 skin), generally include, but do not require, materials which provide three basic
5 characteristics which are associated with hair removal by the process of shaving with a
6 razor blade assembly: (a) Wetting: using surface acting agents, otherwise known as
7 wetting agents or surfactants, which allow the shaving composition to better adhere to
8 the surface of the skin and hair, thereby producing improved softening of the hair,
9 removal of grease and oils from the skin and hair, and improved removal of the shaving
10 composition during the rinsing phase, after shaving is completed; (b) Lubrication: with or
11 without gelling aids and/or post-foaming agents, such as described in U.S. Patent No.
12 3,541,581 by Monson, are employed to create a thin, but easily penetrable boundary layer
13 between the shaving blade and the skin, thereby serving to cushion the shaving blade
14 from the skin in order to avoid nicks and cuts, and also serving to reduce skin irritation,
15 as well as to support the hairs to cause them to assume an erect position, thereby setting
16 the hair up for the shaving razor blade assembly to provide improved hair removal; and
17 (c) Softening: with emollients and skin conditioners are incorporated in shaving media to
18 open skin pores, soften the hairs, and soften the exposed skin. Typical emollients are
19 described in U.S. Patent Nos. 4,994,265 or 4,917,884.

20 In the same manner, it is well known in the prior art that many cleansing soaps
21 include cleansing agents in order to remove foreign materials and dead skin from the
22 surface of the skin, including hands, face, and legs. Such cleansing agents have been
23 reported in prior art U.S. Patent Nos. 4,155,870; 5,298,181; and 4,051,056. These
24 cleansing agents produce added scrubbing action in conjunction with a soap to provide

1 effective removal of stubborn stains, foreign materials, irregular skin surfaces, and dead
2 skin cells, leaving the post-cleansed skin surface ultra-smooth. For example, facial
3 cleanser scrubs have been in use for many years to smooth rough features and remove
4 grease, oils, and dead skin cells. However, this application has never been applied
5 toward shaving compositions, whether applied to the face, or the legs or underarms.

6 A U.S. safety razor manufacturer, recently introduced a new type of woman's
7 razor blade assembly called the Schick Silk EffectsTM, whereby the blade or assembly of
8 multiple blades is enclosed in a fine wire wrapping. The support wire provides blade
9 support above the skin surface to provide a nick free shave. However, due to relatively
10 large diameter of the support wire employed, the shaving blade does not produce as
11 close a shave as a razor blade assembly that does not include a wire.

12 It is therefore seen that there still remains a need for a shaving medium
13 composition which provides a nick free shave, yet which provides a close shave such as
14 one would get with a standard razor blade assembly. It is further seen that no prior art
15 shaving compositions are known which include solid, insoluble particles as a part of
16 their formulation. As a matter of fact, the thought of including solid, insoluble particles
17 in shaving compositions might appear to be intuitively offensive and counter-intuitive for
18 a material which is applied to the face.

19 20 **SUMMARY OF THE INVENTION**

21 It is therefore an object of the present invention to provide shaving compositions
22 for use with conventional razor blade assemblies which minimize nicks and cuts, and
23 which yet provide close shaves.

24 It is another object of the present invention to provide a shaving composition in

1 which insoluble particulate additives, such as filler or abrasive materials, are
2 incorporated to reduce undesired nicks and cuts, and improve post-shave skin
3 smoothness.

4 It is another object of the present invention to provide an improved shaving
5 composition with improved cleansing characteristics.

6 It is a further object of the present invention to provide an improved shaving
7 composition which reduces nicks and cuts, and which improves post-shave smoothness
8 regardless of the form of the shaving composition before and/or after application to the
9 skin, that is solid, gel, cream, liquid or aerosol.

10 These and other objects of the invention are achieved by the shaving compositions
11 of the present invention which include an effective amount of insoluble particulate
12 additives, such as inorganic or organic solids or fillers, which additives provide physical,
13 microscopic blade support.

14 As used herein the term "razor blade assembly" means either a straight razor or a
15 safety razor with one or more shaving edge. As used herein the term "shaving
16 compositions" means compositions utilized specifically as a lubricant and blade support
17 for the shaving process using a razor blade assembly, and which may include as required
18 one or more of the following: wetting agents, surfactants, foaming agents or lather
19 producing compositions, gelling aids and post-foaming agents, emollients, cleansing
20 agents, and/or equivalents thereof, and regardless of the constitution of the shaving
21 composition before and/or after application to the skin, that is solid, gel, cream, liquid
22 or aerosol. As used herein the term "particulate additives" means insoluble inorganic or
23 organic solids or filler particles, and equivalents thereof, having a size in the range of
24 from about $0.1\mu\text{m}$ to about $1,000\mu\text{m}$, with particles in the range of about $10\mu\text{m}$ to $500\mu\text{m}$

1 being practical, and 50 μ m to 200 μ m being preferred, although other sizes may be
2 utilized, as discussed below. A single particulate additive or combinations of particulate
3 additives may be used in the shaving compositions of the present invention. As used
4 herein "an effective amount" of insoluble particulate additives is an amount, by weight,
5 which provides physical support for the blade of a razor blade assembly during the
6 personal shaving process. In most instances, from about 0.1% to about 20%, by weight
7 will be adequate, while from about 1% to about 10%, by weight is normally preferred.
8 However, it is to be understood that in some instance an equivalent "effective amount" of
9 insoluble particulate additives less than 0.1% and/or greater than 20%, by weight, and in
10 thick pastes, solids, and gels even as high as 90% or greater may be used in the practice
11 of the present invention. When used in shaving compositions the insoluble particulate
12 solid additives are present as a well dispersed suspension throughout the composition.
13 Insoluble particulate additives which have particular utility in the practice of the present
14 invention include abrasives, and organic solids such as polymeric beads or cylindrical
15 shaped polymeric particles, or synthetic organic fibers, such as the cleansers described in
16 Speranza, et al. U.S. Patent No. 4,735,746.

17 The use of such particulate additives in the shaving compositions of the present
18 invention provide microscopic support for the razor blade assembly during shaving,
19 thereby providing a close but nick free shave with a standard razor blade assembly. In
20 addition to providing microscopic support for the blade, these solid particulate additives
21 also work in conjunction with the razor blade assembly and the user's scrubbing
22 movements during shaving composition application to remove dirt, oils, stains, and dead
23 skin cells from the skin's surface, thereby producing post-shave skin surfaces with
24 improved smoothness and cleanliness as compared to those provided by current,

1 commercially available shaving compositions. Furthermore, the particulate additive solid
2 particles in the shaving compositions of the present invention improve the hair extraction
3 process performed by the shaving blade assembly prior to the blade cutting the hair by:
4 (1) depressing the surface of the skin during shaving so that the post-shave position of
5 the cut hair resides below the surface of the skin, and (2) extracting the hair away from
6 its follicle just prior to being cut, thereby improving the overall smoothness of the post-
7 process skin.

8 These and other objects of the present invention will become apparent to those
9 skilled in the art from the following detailed description, showing the contemplated novel
10 compositions as herein described, and more particularly defined by the appended claims,
11 it being understood that changes in the precise embodiments to the herein disclosed
12 invention are meant to be included as coming within the scope of the claims, except
13 insofar as they may be precluded by the prior art.

14 15 **DETAILED DESCRIPTION OF THE INVENTION**

16 The present invention provides new and improved shaving compositions which
17 include insoluble particulate additives. The particulate additives incorporated into the
18 shaving compositions of the present invention serve multiple purposes and provide
19 several benefits. First, the particulate additives provide microscopic support to the razor
20 blade assembly and superior blade glide by providing physical, parallel support of the
21 blade edge as it moves over the skin surface, and especially over skin irregularities. This
22 micro-glide support system promotes nick-free shaves, with ultra-smooth post-shave skin
23 smoothness. Second, the solid particles act in conjunction with the blade assembly to
24 extract each hair away from its follicle, just prior to being cut. As a result the post-shave

position of each cut hair resides below the surface of the skin, thereby improving the overall smoothness of the post-process skin. Third, the particulate additives cooperate with any cleansing agents which may be incorporated in the shaving compositions to produce added scrubbing action in conjunction with a soap constituent to provide effective removal of dirt, oils, stains, and dead skin cells, foreign materials, irregular skin surfaces, and dead skin cells, thereby leaving the post-cleansed skin surface extremely smooth.

The present invention is not limited to any single shaving composition, but rather to the concept of the inclusion of suitable particulate additives to any shaving composition, regardless of its form before or after it is applied, that is solid, gel, cream, liquid or aerosol.

EXAMPLE 1

One preferred exemplary shaving composition of the present invention is based on that described in U.S. Patent No. 3,852,417 by McLaughlin, but includes added water insoluble organic additives is as follows:

<u>Material</u>	<u>% by Weight</u>
T90X Potassium stearate	5.20
Sodium stearate	1.11
Lauric acid diethanolamide	1.60
Mineral oil (Saybolt viscosity of 75-100 seconds at 100° F)	15.00
Stearic Acid	0.14
Coconut fatty acid	0.68

1	Glycerine	3.20
2	Polyvinylpyrrolidone (Grade K-30)	0.12
3	Perfume	0.37
4	Water	57.58
5	Dichlorodifluoromethane	10.00
6	Particulate additive - Nylon fibers	<u>5.00</u>
7	Total	100.00%

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11 The nylon fibers in this example are preferably cylindrical particles nominally
12 about 50 μ m in diameter and a nominal length of about 200 μ m, although other sizes may
13 be utilized as discussed below. The shaving composition in this example will be
14 prepared by mixing 6.12 parts of stearic acid, 1.60 parts of lauric acid diethanolamide, 15
15 parts mineral oil and 0.68 parts of coconut fatty acids at a temperature in the range of
16 about 167° - 176° F, followed with agitation and admixture of 0.12 parts
17 polyvinylpyrrolidone, 3.2 parts of glycerine, 0.9 parts of potassium hydroxide, and 0.2
18 parts of sodium hydroxide in 57.58 parts of water at a constant temperature in the range
19 of about 167° - 176° F. The resulting mixture will then be cooled to a temperature in
20 the range of about 115° - 125° F with agitation. The perfume and particulate additive
21 nylon fibers will then be added to the mixture, and the temperature cooled to the range
22 of about between about 84° to 88° F. This final liquid mixture will then be placed in an
23 appropriate dispenser under pressure with the addition of propellant for use as an
24 aerosol cream.

25 When dispensed and applied to the face and used for shaving, this composition

1 will provide a shaving experience in which the particulate additives in the shaving
2 composition will provide microscopic support to the razor blade assembly and superior
3 blade glide by providing physical, parallel support of the blade edge as it moves over the
4 skin surface, and especially over skin irregularities, thereby will promote nick-free shaves,
5 with ultra-smooth post-shave skin smoothness. The post-shave position of each cut hair
6 will be found to reside below the surface of the skin, thereby improving the overall
7 smoothness of the post-process skin. In addition, the particulate additives will cooperate
8 with the cleansing agents in the shaving compositions to produce added scrubbing action
9 to provide effective removal of dirt, oils, stains, and dead skin cells, foreign materials,
10 irregular skin surfaces, and dead skin cells, and will thereby leave the post-cleansed skin
11 surface extremely smooth.

12 When the formulation of **EXAMPLE 1** is modified, first using 10% and then using
13 20%, by weight, insoluble nylon fibers, while in each instance proportionally decreasing
14 amounts of water and/or Mineral oil, the resulting shaving compositions will provide a
15 shaving experience which is equivalent to the original formula, suggesting that even
16 greater amounts of insoluble particles can be used in the practice of the present
17 invention.

18 **EXAMPLE 2**

19 Another exemplary composition is based on that described in McLaughlin U.S.
20 Patent No. 3,852,417, and includes abrasive inorganic additives, as follows:

21	<u>Material</u>	<u>% by Weight</u>
22		
23		
24	Ti110X Potassium stearate	5.20
25	Sodium stearate	1.11

1	Lauric acid diethanolamide	1.60
2	Mineral oil (Saybolt viscosity of	
3	75-100 seconds at 100° F)	17.00
4	Stearic Acid	0.14
5	Coconut fatty acid	0.68
6	Glycerine	3.20
7	Polyvinylpyrrolidone (Grade K-30)	0.12
8	Perfume	0.37
9	Water	57.58
10	Dichlorodifluoromethane	10.00
11	Particulate additive - silica sand	<u>3.00</u>
12	Total	100.00%

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14

15 The silica sand employed in this example is nominally about 75 μ m in size,
16 although other sizes may be utilized as discussed below.

17 This shaving composition will be prepared by mixing 6.12 parts of stearic acid,
18 1.60 parts of lauric acid diethanolamide, 17 parts mineral oil and 0.68 parts of coconut
19 fatty acids at a temperature in the range of about 167° - 176° F, followed with agitation
20 and admixture of 0.12 parts polyvinylpyrrolidone, 3.2 parts of glycerine, 0.9 parts of
21 potassium hydroxide, and 0.2 parts of sodium hydroxide in 57.58 parts of water at a
22 constant temperature in the range of about 167° - 176° F. The subsequent mixture will
23 then be cooled to a temperature of 115 ° - 125° F with agitation. The perfume and silica
24 sand will be added to the mixture, and the temperature cooled to the range of about
25 between about 84° to 88° F. This final liquid mixture will then be placed in an

1 appropriate dispenser under pressure with the addition of propellant for use as an
2 aerosol cream.

3 When the aerosol medium will be disbursed from its container onto the skin
4 surface, either directly or upon admixture of the medium in a suitable container or in the
5 hand of a user, it will quickly foam, and when applied to the face it will wet the surface
6 of the skin, softening the skin surface and the hair to be shaved, forcing the hair strands
7 to stand erect normal to the surface of the skin, and opening skin pores. When a
8 standard blade assembly will be subsequently employed over the surface of the skin, it
9 will cut each strand of hair in its path, using the shaving medium as lubricant with each
10 swath. Post-shave skin surfaces will be nick free and ultra-smooth.

11 Insoluble particulate additives which are suitable for incorporation into standard
12 shaving media compositions in accordance with the present invention include, but are not
13 limited to thermoplastic and thermosetting resin polymers and inorganic materials such
14 as the following:

- | | | | | |
|----|----|-------------------------|----|----------------------------------|
| 15 | a) | polyamides (e.g. nylon) | b) | polytetrafluoroethylene (Teflon) |
| 16 | c) | acetal resins (Delrin) | d) | polypropylene |
| 17 | e) | polyethylenes | f) | polyurethane |
| 18 | g) | silica | h) | pumice |
| 19 | i) | wood dust | j) | quartz |
| 20 | k) | titanium dioxide | l) | calcium carbonate |
| 21 | m) | calcium phosphate | n) | calcium silicate |
| 22 | o) | aluminum oxide | p) | silicon nitride |
| 23 | q) | boron carbide | r) | silicon carbide |
| 24 | s) | diatomaceous earth | | |

1 Because of the ability to shape synthetic fibers such as nylon or acetal resin, these
2 materials are two of the preferred additive materials. Furthermore, as softer materials,
3 such synthetic fibers tend to be less of an irritant to the skin, and therefore are less likely
4 to cause rashes or other adverse skin reactions typically associated with the harder or
5 abrasive cleansers. Such synthetic fibers are also abundant in supply and easily
6 produced. Strands of these fibers are available in many diameters, and easily cut to
7 desired lengths for incorporation into the shaving composition. The optimal synthetic
8 fiber diameter should be on the order of the typical blade edge thickness, or roughly
9 about 50 μ m to about 200 μ m; however, other diameters may also be utilized. In order to
10 allow the maximum coverage area for micro-blade support, the aspect ratio of the chosen
11 polymeric fiber additives are preferably from about 3:1 to about 5:1, that is the fiber
12 length is preferably about 3 to 5 times greater than the diameter of the fiber; however,
13 aspect ratios below 3:1 and above 5:1 can also be employed if preferred. As noted
14 above, an effective amount of insoluble particulate additives is an amount, by weight,
15 which provides physical support for the blade of a razor blade assembly during the
16 shaving process. In most instances, from about 0.1% to about 20%, by weight will be
17 adequate, while from about 1% to about 10%, by weight is preferred. However, it is to
18 be understood that in some instance an equivalent "effective amount" of insoluble
19 particulate additives less than 0.1% and greater than 20%, and in thick pastes, solids,
20 and gels even as high as 90% or greater may be used in the practice of the present
21 invention.

22 The shaving media of the present invention is easily adapted for employment with
23 standard or conventional pressurized or aerosol dispensers commonly available for
24 commercial shaving creams and gels, or solid-stick applicators. Such application methods

1 are described in U.S. Patent Nos. 5,174,992 by Lindauer, et. al., or 4,145,411 by Mende.
2 Since the shaving compositions of the present invention may incorporate a single solid
3 additive or combination of solid additives, no special considerations for media delivery
4 must be reconciled. The minute size of the particles incorporated into the shaving
5 composition allows easy passage from the stable in-situ composition container to the air
6 via traditional dispensing nozzles which incorporate large openings and travel diameters,
7 typically on the order of 10 millimeters or more. Standard aerosol propellants may be
8 employed in the delivery of the shaving compositions of the present invention.

9 As noted above, the present invention encompasses any and all shaving
10 compositions, whether in solid, gel, cream, liquid or aerosol form (before and/or after
11 application to the skin), incorporating insoluble particulate additives which provide
12 improved blade glide, improved hair retraction from skin, and reduced skin abrasion,
13 cutting and nicking over irregular surfaces or skin abnormalities.

14 It is therefore seen that the shaving compositions of the present invention are
15 clearly different not only from prior art shaving compositions, but also clearly different
16 from abrasive facial scrubs, cleaning compounds, and general soaps. Furthermore, the
17 present invention is clearly discernable from prior art shaving compositions which employ
18 soluble materials in shaving compositions for improved lubricity. In addition, it is seen
19 that the compositions of the present invention which provide shaving compositions in
20 which insoluble particulate additives, such as organic or inorganic fillers or abrasive
21 materials, are incorporated. It has been shown that when such shaving compositions are
22 used with conventional razor blade assemblies they will minimize nicks and cuts, and yet
23 will provide a close shave, and improve post-shave skin smoothness, and improved
24 cleansing characteristics.

1 The foregoing exemplary descriptions and the preferred embodiments of the
2 present invention have been explained in detail, with varying modifications and
3 alternative embodiments being taught. While the invention has been so shown and
4 described, it should be understood by those skilled in the art that equivalent changes in
5 form and detail may be made therein without departing from the true spirit and scope of
6 the invention, and that the scope of the present invention is to be limited only to the
7 claims except as precluded by the prior art. Moreover, the invention as disclosed herein,
8 may be suitably practiced in the absence of the specific elements which are disclosed
9 herein.